201

OPERATION
AND
SERVICE MANUAL

[redacted]

INDUSTRIES, INC.

WARRANTY

TELONIC INSTRUMENTS AND ACCESSORIES

Products manufactured by TELONIC INDUSTRIES, INC. are guaranteed against defective materials and workmanship for a period of one year (vacuum tubes and semiconductors excepted) from date of purchase. This warranty does not apply to instruments that have been altered, improperly handled or damaged in any way beyond our control.

Instruments must be examined immediately upon receipt, since claims for damage in transit will not be honored by the carrier unless prompt action is taken.

CHANGES IN SPECIFICATIONS

The right is reserved to change the published specifications of equipment at any time, and to furnish merchandise in accordance with current specifications, without incurring any liability to modify equipment previously sold.

RETURNING EQUIPMENT TO FACTORY

Factory service is available for repair and readjustment of this instrument. However, a description of the trouble should be forwarded FIRST, whereupon instructions for correcting the trouble OR authorization for returning the equipment will be given. This applies to all units, whether under warranty or not.

MODEL E- 1
E- 1M

SERIAL NO. A 14882

PLUG IN OSCILLATOR

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CONVERSION INFORMATION

Commencing with equipment shipped after about July 22, 1963, certain modifications have been incorporated in the Telonic SM-2000 plug-in series, and in the Telonic SM-2000 control chassis. These modifications may render the units incompatible with those previously shipped unless the earlier instruments are modified also. The equipment in which these modifications have been made can be identified by the letter "A" prefixed to the serial number.

Units not so identified must be modified if they are to be compatible with instruments now being shipped. The modifications to be made are listed below, divided into two groups - those to be made to earlier SM-2000's and those to be made to earlier plug-ins.

SM-2000 CHANGES

1. On J601, remove all wires presently connected to pin 8 and reconnect them at pin 7; remove the jumper between pins 7 and 8.

2. Using shielded wire, type RG-174/U or equal, connect pin 8 of J601 to the printed circuit board land which leads to pin 1, V303. Ground the shield by connecting it to a convenient ground land nearby.

3. Prefix the letter "A" to the serial number of the instrument.

PLUG-IN CHANGES

1. On P601 remove all wires presently connected to Pin 8 and reconnect them at pin 7; remove the jumper between pins 7 and 8 if one is connected.

2. Prefix the letter "A" to the serial number of the instrument, if none is prefixed.

Changing the serial number of the instrument is as important in the modification as are the electrical requirements, as the ability to identify a unit as having been or not having been modified is involved.

ADDENDUM SHEET

MODEL E-1/E-1M PLUG-IN SWEEP OSCILLATOR INSTRUCTION MANUAL

Page 17, Parts List:

Add Circuit Reference: R707 (Effective with Serial No. 14672)
Under Description - Add: RFC, 120Ω, ±10%, 1/8W
Under Telonic Part No. - Add: R-1825

Circuit Reference CR702:
Under Description - change from: DSD, S3411G
to read: DSD IN831
Under Telonic Part No. - change from: D-22
to read: D-49

Add Circuit Reference: R706
Under Description-Add: RFC, 47Ω ±10%, 1/2W
Under Telonic Part No. - Add: R-55

Circuit Reference C608: (Effective with SN 14856 for E-1 units and SN 14891 for E-1M units.)
Under Description - change from: RFW, 4Ω, ± 5%, 5W
to read: RFW, 2Ω, ± 5%, 5W
Under Telonic Part No. - change from: R-410
to read: R-422

Page 7, PROCEDURE, item 4. (Effective with serial No. A14877)

Change from: 4. Turn power ON, allow a 15 minute_____ outlined
to Read: 4. Turn power ON, allow a 30 minute warmup period, and make adjustments as outlined

Page 17, Parts List:

Add Circuit Reference R708 (Effective after Serial No. A15458)
Under Description - Add: RFC, 100KΩ, ±10%, 1/2W (SC)
Under Telonic Part No. - Add: R-28

SECTION I SPECIFICATIONS

INTRODUCTION

The E-1 is a plug-in sweep oscillator for use with designated Telonic Control Chassis. The sweep ratio and sweep rate functions of the control chassis are not utilized with this unit. Outputs at the fundamental (RF 1) and second harmonic (RF 2) frequency of the sweep oscillator are provided.

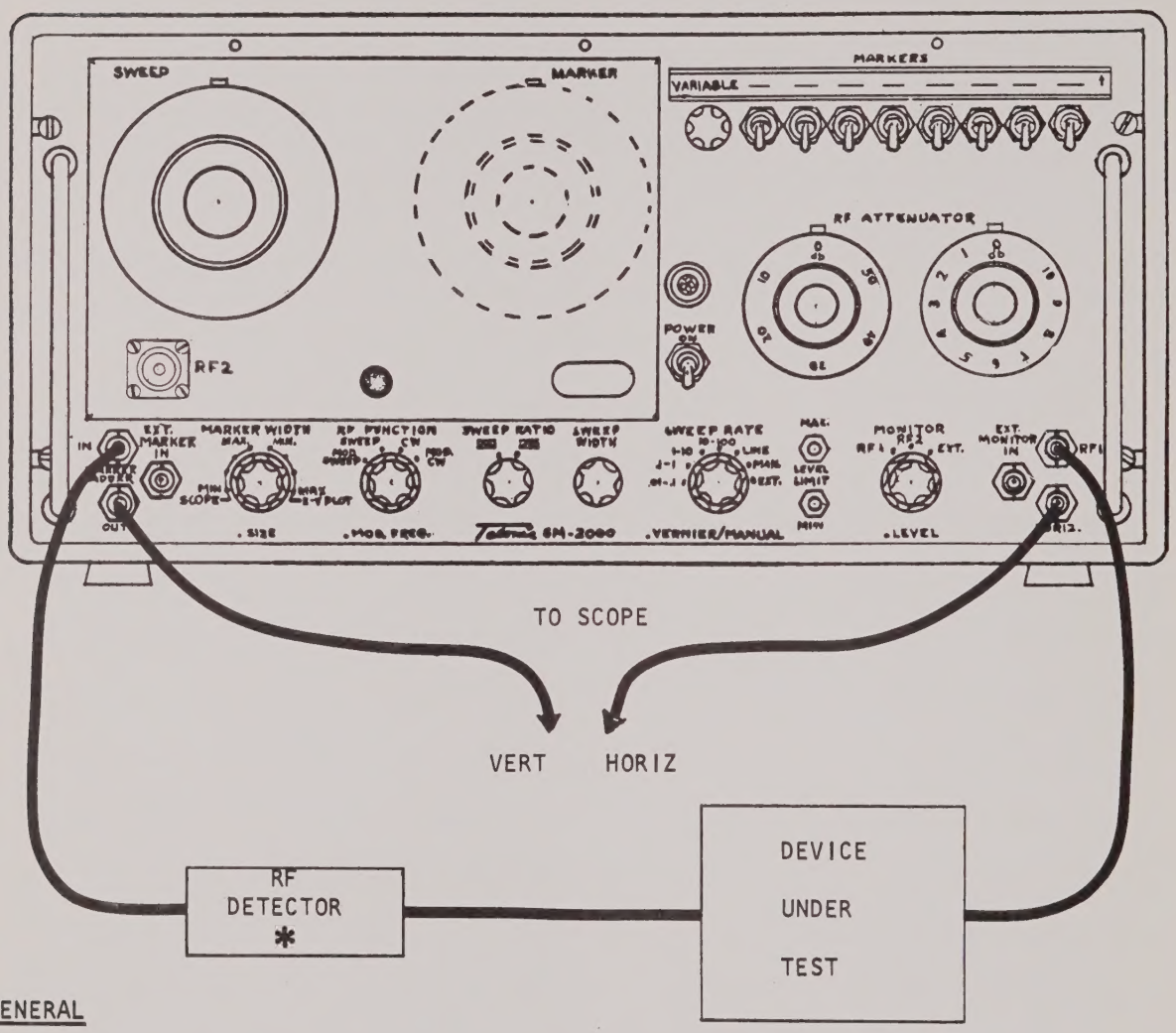
The E-1M includes a variable marker covering the entire sweep range. This difference is clearly indicated throughout the manual.

SPECIFICATIONS

	RF 1 OUTPUT	RF 2 OUTPUT
CW AND SWEEP CENTER FREQUENCY RANGE	460-920 Mc	920-1840 Mc
SWEPT FREQUENCY RANGE	435-970 Mc	870-1940 Mc
SWEEP WIDTH	0.02-10%	0.02-10%
OUTPUT VOLTAGE		
Sweep	1 vrms	0.25 vrms
Approximate CW Output	0.5 vrms	0.125 vrms
FLATNESS		
At Maximum Sweep Width	±1.0 db	±1.0 db
Overall	±1.0 db	±1 db
LINEARITY	1.4:1 or better	1.4:1 or better
VARIABLE MARKER (E-1M only)		
Frequency Range	435-970 Mc	870-1940 Mc
Accuracy	±0.3%	±0.3%
VERNIER RF LEVEL CONTROL RANGE	0-6 db	0-6 db

SECTION II .. OPERATING INSTRUCTIONS

TYPICAL SET UP



GENERAL

DESCRIPTION OF FRONT PANEL

SWEEP — The sweep dial, which sets the center frequency of the sweep oscillator by means of a variable capacitor.

MARKER — The variable marker dial, calibrated in two ranges to cover the full swept range of the unit. This control adjusts frequency by varying the length of a tuned line.

RF 2 — The output at this connector is at the second harmonic of the sweep oscillator frequency.

GENERAL

1. Make sure the control chassis power is OFF before inserting the plug-in oscillator into the Control Chassis. If the power is ON, transient voltages may damage diodes in the units. Insert plug-in oscillator and secure it in the chassis by tightening the fastening rod with the knob in the lower center of the front panel.

2. Make connections to the scope (or recorder), the device under test, and RF Detector as shown. All connectors located on the control chassis are "BNC" type. The RF 2 connector on the E-1 is "N" type. It is recommended that RG Cable be used for all connections to insure good ground connections and to minimize hum, leakage, and spurious signal pickup. The cable used to connect the RF output to the device under test should have a characteristic impedance of 50Ω. If the input impedance of the device under test is other than 50Ω, a matching network should be used to insure a constant input signal.

3. Connect the device under test to the RF 1 output on the control chassis or to the RF 2 output on the plug-in oscillator as appropriate for the frequency range of the test circuit.

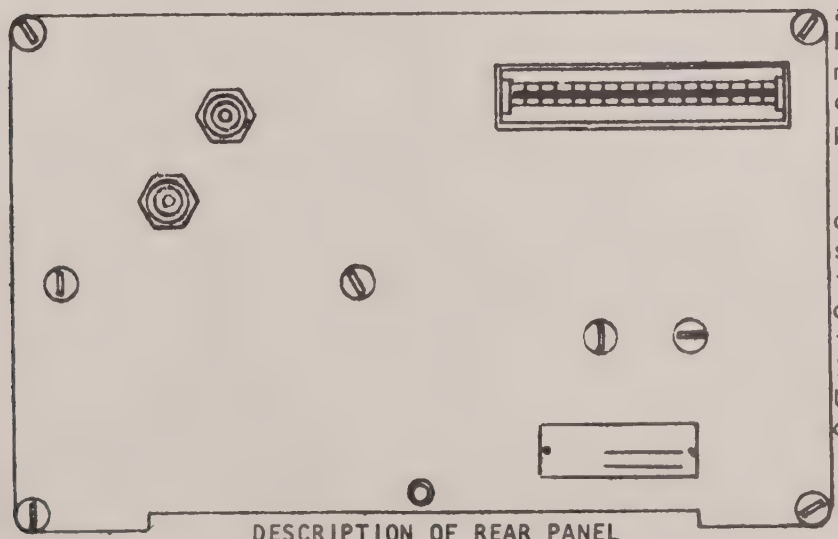
4. Refer to the manual for the Control Chassis for additional instructions. NOTE: To insure a constant amplitude output signal, the LEVEL MAX and MIN Controls should be set as prescribed in the control chassis manual and in the CALIBRATION PROCEDURE of this manual. These adjustments vary with the individual oscillator and with the output used.

5. To insure proper operation of both units, refer to Section IV (CALIBRATION PROCEDURE) of both manuals.

6. Proceed in accordance with recommendations of the manufacturer of the device under test concerning alignment, adjustment, and tests.

*See Telonic literature for suitable detector for this use.

DRAWING OF REAR PANEL



DESCRIPTION OF REAR PANEL

NOTE:
For optimum performance on the RF 2 band, it is recommended that the fundamental (RF 1) output be terminated in in its nominal 50Ω impedance. The RF 1 output can be considered effectively terminated when 20db or more of fixed attenuation is switched in with the RF ATTENUATOR on the control chassis.

The three electrical connectors on the rear panel are:

Two BNC plugs, which mate with BNC jacks on the Control Chassis. These are the RF output connector (RF 1 frequency) and variable marker (RF) output.

A 32-contact plug which makes the other electrical contacts necessary through a mating jack on the control chassis.

SECTION III .. GENERAL DESCRIPTION

GENERAL

This plug-in oscillator has one RF output at the fundamental frequency of a tuned-line oscillator and another at the second harmonic. Center frequency tuning is accomplished by variable capacitors across the line.

The variable marker is produced by a CW oscillator which is tunable on the front panel. Variable tuned-line circuitry is used between plate and grid.

SWEEP OSCILLATOR

The sweep oscillator employs a 6AF4A in a tuned line type oscillator circuit. The fundamental frequency of the sweep oscillator is the RF 1 output frequency indicated in the Specifications. The RF 2 output is the result of harmonic generation in a non-linear device. Center frequency tuning is accomplished by precision machined capacitors whose shaft is ganged to a tunable band-pass filter which automatically tracks the second harmonic of the sweep oscillator. The band pass of the tuned filter is over 10% of center frequency, thereby allowing sufficient coverage of the sweep oscillator at maximum sweep width with high enough Q to obtain up to 0.25 volts of the second harmonic output and to reduce the spurious output to practically zero.

A linear sweep (frequency change versus horizontal display) is provided by variable inductances which are sine wave mechanically driven by a motor secured at the base of the sweep oscillator assembly. Inductance change occurs when a silver strap mounted on a fiber glass cylinder vibrates and cuts the flux path of the tuned lines. The rate of vibration is fixed at 60 cycles (line frequency) and the amplitude is controllable by the control chassis and plug-in SWEEP WIDTH Controls. The position of this strap on the fiber glass cylinder and in relation to the tuned lines is carefully adjusted at the factory for optimum linearity and sweep width. Since a sine wave voltage is used to drive the motor and horizontal deflection plates of the oscilloscope, the frequency change versus horizontal deflection trace appearing on the scope represents the true linearity of the sweep oscillator.

The RF 1 signal is coupled to the RF 1 output connector on the Control Chassis front panel through a monitor block and the RF attenuators in the control chassis. The RF 2 output is coupled through the tuned band-pass filter and a monitor, both in the plug-in, to the connector on the front panel of the oscillator.

See the Control Chassis Manual for discussion of monitoring and leveling action.

VARIABLE MARKER (E-1M, E-2M, E-3M ONLY)

The variable marker oscillator uses a 6AF4 tube, and is tuned by adjusting its tuned lines. The tuning range of the marker is sufficient to cover the entire range of the sweep oscillator. A 5:1 vernier drives the marker dial which is individually calibrated to an accuracy of 1/4 of 1%.

The output from the variable marker oscillator is then fed into a crystal diode mixer where it is mixed with a sample of the sweep oscillator signal. The resultant birdy is then fed into the birdy-by-pass amplifier.

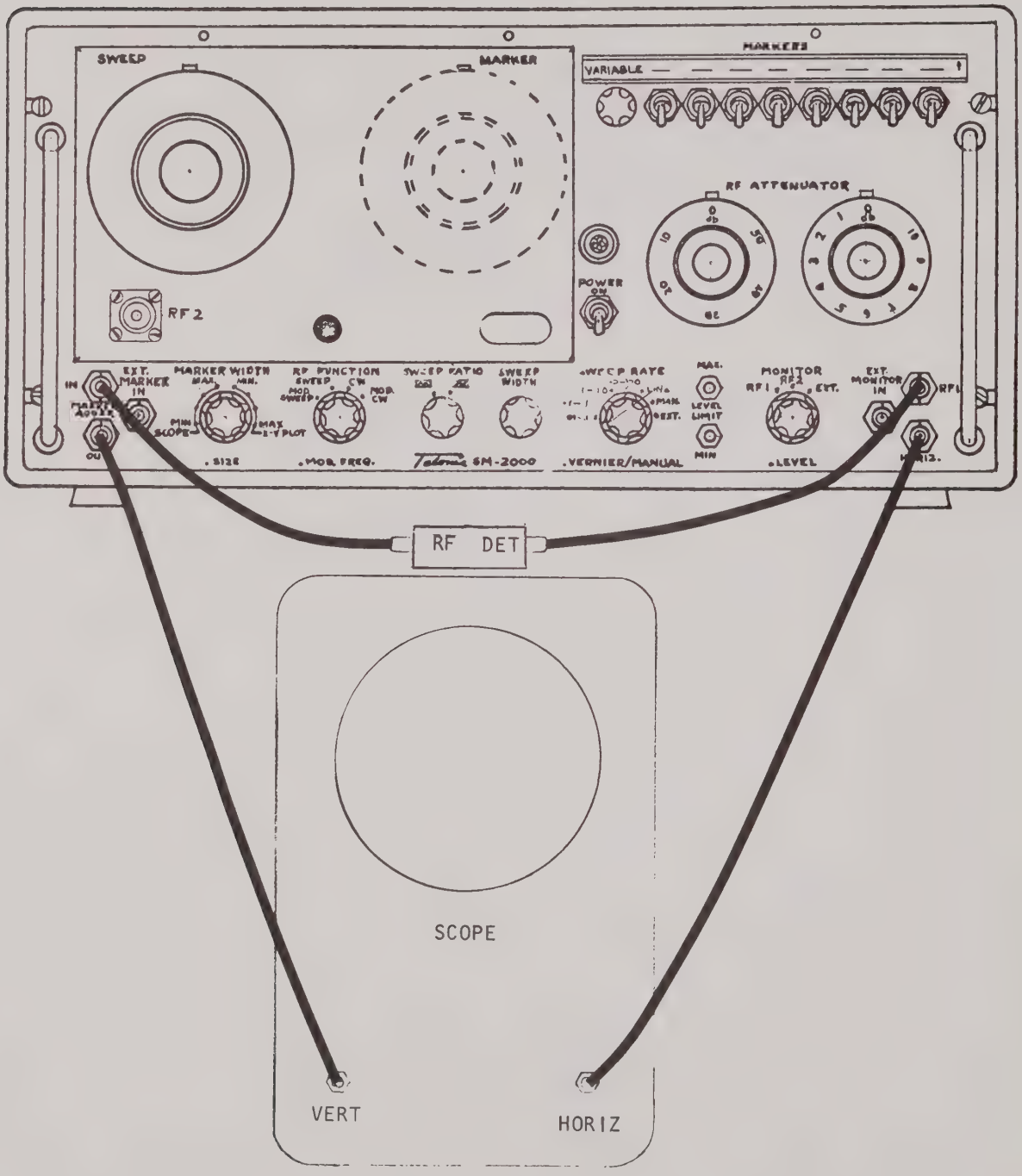
FIXED MARKERS

The sweep sample fed to plug-in marker units is the fundamental (RF 1) oscillator output. This results in a marker at the fundamental frequency on the RF 1 output and at the second harmonic on the RF 2 output. Thus a 50 Mc harmonic marker unit will mark at 50 Mc intervals on the demodulated RF 1 response curve but at 100 Mc intervals on the RF 2 trace.

Similarly a fixed frequency marker will indicate the nominal frequency on the RF 1 trace and the second harmonic of that frequency on the RF 2 trace.

SECTION IV .. CALIBRATION PROCEDURE

TYPICAL SET UP



NOTE: For greater accuracy, certain adjustments (specified in the text) should be performed with a power meter replacing the detector and scope in the above setup.

GENERAL

The following procedure should be applied after changing any component in the E-1 plug-in oscillator or at any time the calibration is noted to be incorrect.

Complete calibration of the E-1 involves adjustment of two classes of controls.

Those located in the E-1 which affect the operation of the control chassis.

Those located in the control chassis which affect the operation of the E-1.

NOTE: Although preliminary adjustments may be made with the cover removed from the oscillator section, final adjustment requires that the cover be in place. See chassis layout in schematic section for location of adjustments.

TEST EQUIPMENT

50Mc harmonic marker (such as the Telonic Model CDH-50)
5Mc harmonic marker (such as the Telonic Model CDH-5.0)
50Ω RF power meter
RF detectors (see Telonic literature for recommended detectors)
Oscilloscope

PROCEDURE

1. Make connections as shown.

2. Use double-shielded (RG) 50Ω cable for all RF connections to insure good connections and minimum radiation, and to avoid pickup of spurious signals. The detector must match the 50Ω cable, or a matching network must be used.

3. With power OFF, plug in the E-1 and secure in place.

4. Turn power ON, allow a 15 minute warmup period, and make adjustments as outlined.

SWEEP WIDTH (Adjustment)

This adjustment is set to provide 10% sweep width. Since the percent of sweep width increases only very slightly with frequency, a 10% setting at 500 Mc assures sufficient sweep width at all frequencies.

Preset the following controls:

Control Chassis
- SWEEP WIDTH fully clockwise
- RF FUNCTION Switch to SWEEP
- MONITOR Switch to RF 1
- 5 Mc harmonic marker ON
- All other markers OFF

E-1
- Sweep dial to 500 Mc

CALIBRATION PROCEDURE

Adjust E-1 SWEEP WIDTH Control for ten full marker intervals on the scope. This can be acoomplished accurately by alternately adjusting the SWEEP dial and SWEEP WIDTH Control to place a marker at each end of the trace with nine markers between. Due to some non-linearity in the sweep, the SWEEP dial will not read exactly 500 Mc at the conclusion of this adjustment.

BLANKING PHASE (Adjustment)

After the sweep width adjustment, this control is set for a rectangular pattern. Misadjustment will result in a pattern similar to the following:

HORIZONTAL PHASE (Adjustment)

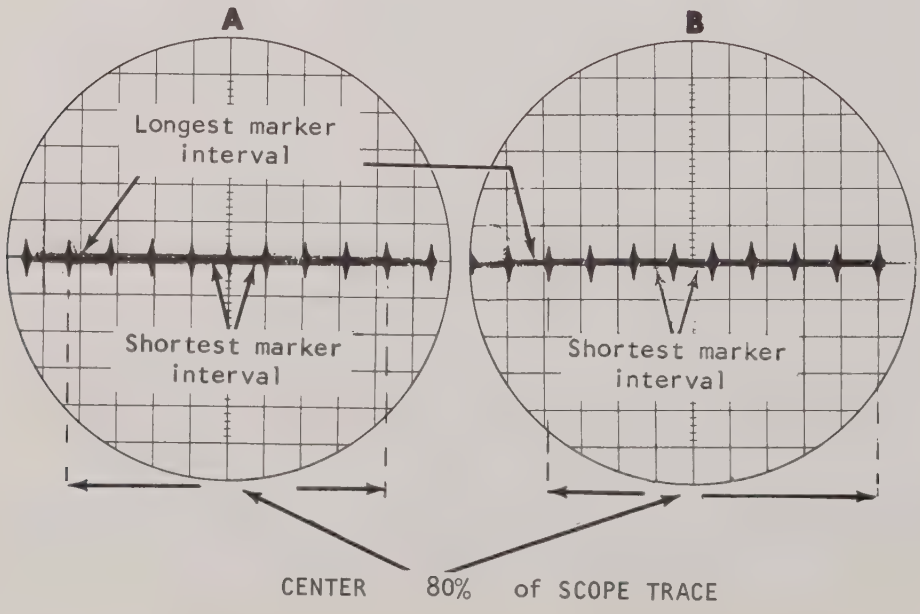
After completing the blanking phase adjustment, set this control for the best linearity possible, still maintaining a reasonably rectangular pattern. See LINEARITY CHECK below. If necessary, readjust the BLANKING PHASE Control following this adjustment.

LINEARITY CHECK

Linearity measurements are made over the center 80% of the display at 10% sweep width.

Leave controls set as at the conclusion of the HORIZONTAL PHASE adjustment.

Locate the shortest marker interval in the center 80% of the display. Adjust the horizontal gain control on the scope so that this interval occupies exactly one scope division. See Figure A below. Locate the longest marker interval in the center 80% of the display. Adjust the horizontal position on the scope so that the interval begins on a graticule line. See Figure B below. Measure the marker interval. Its length (in scope divisions) indicates the linearity ratio: A length of 1.15 scope divisions for the longest marker interval represents a linearity of 1.15 to 1.



SWEEP B+ (Adjustment)

This control limits the maximum oscillator B+ to a safe operating level. It is set for rated RF output.

1. Connect the RF 1 output to a 50Ω RF power meter.

2. Preset the following controls:

   Control Chassis
   - RF FUNCTION Switch to SWEEP
   - SWEEP WIDTH fully counter-clockwise
   - MONITOR Switch in EXT position
   - LEVEL fully clockwise
   - MAX LEVEL LIMIT for maximum output
   - RF ATTENUATORS to 0 db position

   Plug-In Oscillator
   - SWEEP B+ fully counter-clockwise
   - SWEEP Dial for frequency at which output is lowest

3. Adjust the SWEEP B+ for just over 10 mw output (1/2 of the 20 mw rated output, allowing for 50% duty cycle of the sweep oscillator).

4. Connect the power meter to RF 2. Again use the SWEEP Dial to locate the minimum output. If this is less than 625 μw, raise the SWEEP B+ setting enough to exceed this figure slightly.

   NOTE: A fixed B+ limit is used in the CW, MOD CW Modes.

MAX and MIN LEVEL LIMIT (Control Chassis)

The procedure outlined in the Control Chassis Manual for setting these controls is repeated here, with additional information peculiar to operation with the E-1.

The settings of these controls will be different for RF 1 and RF 2 outputs if a calibrated level is to be maintained. Thus, if the controls have been set for RF 1 output of 1 vrms (power meter reading of 10 mw) and desired LEVEL Control range, it will be necessary to readjust these controls for RF 2 output of 0.25 vrms (power meter reading of 625 μw) and desired range.

1. With the power meter still connected and controls set as at the conclusion of the SWEEP B+ Adjustment, adjust the MAX LEVEL LIMIT for rated output.

2. Disconnect the power meter and reconnect scope and detector as shown in TYPICAL SETUP.

3. Insert fixed attenuation in an amount equal to the desired range (not exceeding 6 db) of the LEVEL Control. For the RF 1 output, the attenuators in the Control Chassis should be used. For the RF 2 output, the use of a fixed single-pad coaxial attenuator, flat over the RF 2 range, is recommended.

4. Note the level of the scope pattern.

5. Remove attenuation, rotate LEVEL Control fully counter-clockwise. Set MIN LEVEL LIMIT for same scope deflection as seen in Step 4.

FLATNESS CHECK

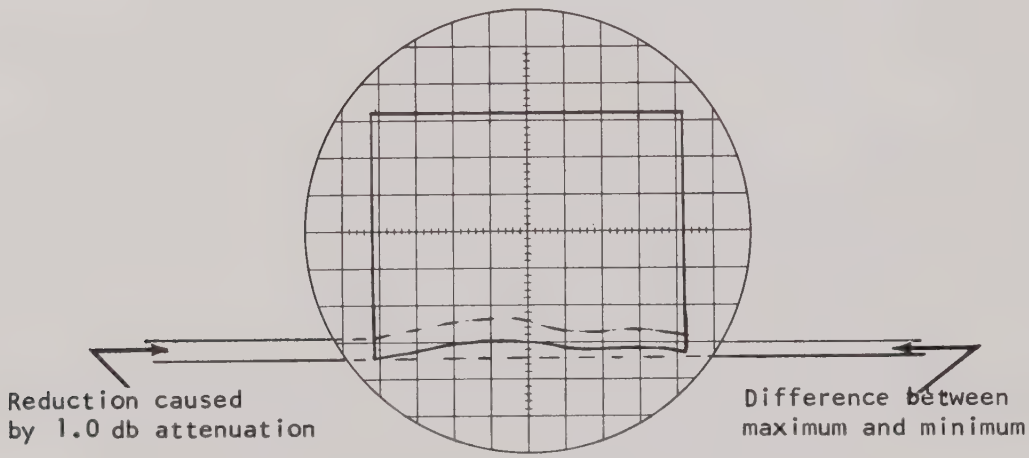
Flatness is measured over maximum sweep width. At any center frequency setting, the minimum output at full sweep width must be no more than 1.0 db lower than the maximum.

1. With controls set as above, rotate the LEVEL and SWEEP WIDTH Controls fully clockwise.

2. Rotate the SWEEP Dial to locate the point at which maximum tilt, or other unflatness feature, occurs.

3. Note the difference between maximum and minimum output levels.

4. Insert a known quantity of attenuation (preferably 1 db) and compare the reduction in output with the noted difference between maximum and minimum. With RF 2 output the attenuator should be similar to that described for such use in the preceding adjustment operation. The difference between maximum and minimum output must be no more than the signal reduction caused by 1.0 db of attenuation.



VARIABLE MARKER CHECK

Although there are no adjustable electrical components in the variable marker circuit to compensate for dial inaccuracies, the following procedure can be used to restore specified dial accuracy when tube replacement is necessary:

NOTE: All marker dial calibrations are made with the tube well-seated in the socket. If the tube is positioned otherwise, the high frequency end of the range will be shifted.

1. Obtain several 6AF4A tubes which have been aged several days with filaments continually burning.

2. Turn on both harmonic markers and the variable marker. Check the marker dial accuracy at the lowest frequency setting by superimposing the variable marker over the appropriate harmonic marker. If calibration at this point is incorrect, loosen the set screw holding the knob and dial assembly to the tuning shaft and rotate the dial to bring the proper dial mark under the indicator hairline.

3. Similarly check the marker dial accuracy at the highest frequency setting. If dial is inaccurate, select a tube from the aged stock which will restore accuracy at this point. Usually the effect of tube selection on the high frequency end is considerable, but negligible on the low frequency end.

4. Recheck each end of the range as above until best possible overall accuracy is obtained.

Factory recalibration service is also available.

SECTION V .. MAINTENANCE

GENERAL PROCEDURE

Since this is a plug-in unit, many of the possible malfunctions of the oscillator are the result of part failure in the control chassis. The connections at P601 of the plug-in oscillator and at J601 of the control chassis afford a convenient means of tracing the source of troubles to the oscillator or chassis.

In locating troubles which have been traced to the oscillator, application of the common rules of electronic maintenance, including a visual check for damage, open filaments, glowing anodes, shorted tuning capacitors, and charred resistors, is an obvious measure. All connectors, particularly P601 and J601 should be checked for cleanliness.

EXTENSION CABLE

For maintenance work requiring access to parts located on the under side of the plug-in or in other areas not easily reached, an extension cable may be obtained from Telonic Industries, Inc. This cable, having the 32-contact plug on one end and the 32-contact jack on the other, allows the oscillator to be removed from the control chassis and operated on the bench.

ACCESS TO RF COMPARTMENT

To take off the top cover of the oscillator compartment, remove the necessary screws.

> CAUTION: The red-lacquered screws securing the drive motor to the bottom of the compartment should not be disturbed. The position of this drive motor is critical, and these mounting screws are factory adjusted for optimum oscillator performance.

The following chart will be of service in deciding whether a trouble lies in the oscillator or control chassis.

SYMPTOM	CHECK (Pin Numbers Refer to P601)
Weak or no output or unleveled output	DC voltage at Pin 31 with RF LEVEL fully clockwise.
RF 2 output not leveled	RF 1 output
No sweep width	Resistance between Pins 27 and 9, 26 and 27, 26 and ground
No variable marker (plug-in marker present)	1. For birdy at Pin 17
	2. DC voltage at Pin 1

If the chart shows that the trouble probably is in the control chassis, refer to the MAINTENANCE Section of the manual for that unit. A common trouble is unleveled RF 1 output due to failure of the monitor diode in the control chassis. This part can be replaced as necessary by following the procedure outlined in the control chassis manual.

If the trouble appears to be in the plug-in, the following chart may be of assistance in localizing the failure.

SYMPTOM	CHECK
Both outputs weak, absent, or unleveled	V701 and associated components
Low RF 2 output (RF 1 output normal)	CR701; CR702
No sweep width	Resistance, P601-26 to ground; R605
No variable marker	Connect an external CW source within the variable marker range to the EXT MARKER input of the control chassis and check for a birdy. If a birdy appears with the external CW source, but not with the variable marker, the variable marker oscillator is probably inoperative. Check V801, then other components if necessary.

It is assumed that the above procedures have been applied and that the jumpers on P601 are intact. Where "inconclusive" is shown, the next step should be followed.

IF RESULT IS	TROUBLE PROBABLY IN OSCILLATOR	CONTROL CHASSIS
High 100-175v	X	
Low or zero 0-100v		X
Leveled RF 1 output	X	
RF 1 output not level		X
Open between		
27 and 9	X	
26 and 27		X
26 and ground	X	
Continuity on all checks		X
Birdy present		X
No birdy	Inconclusive.	See Check #2.
100v	X	
Low or no voltage		X

SCHEMATIC PART DESIGNATION

C	Capacitor
CR	Crystal Rectifier
J	Jack
L	Inductor
P	Plug
R	Resistor, Fixed or Variable
V	Tube
Z	Miscellaneous

SCHEMATIC VALUE ABBREVIATION

Ω	ohms
K	1,000 ohms
M	1,000,000 ohms (megohms)
µf	Microfarad
pf	Picofarad
µh	Microhenry
mh	Millihenry

OTHER ABBREVIATIONS

F.P.	Front Panel
R.P.	Rear Panel
T.P.	Test Point

RESISTORS - All resistors are 1/2 watt, ± 10%, and are shown in ohms, unless otherwise specified.

CAPACITORS - All capacitors are shown in picofarads (pf) unless otherwise specified.

COILS - All inductors are shown in microhenries (µh) unless otherwise specified.

CIRCUIT REFERENCE SYMBOL - LOCATION INFORMATION

601 - 699	Interconnecting elements	701 - 799	Sweep Oscillator
		801 - 899	Variable Marker

*Indicates value of component adjusted at factory, and may deviate from value shown on print.

SECTION VI .. PARTS LIST

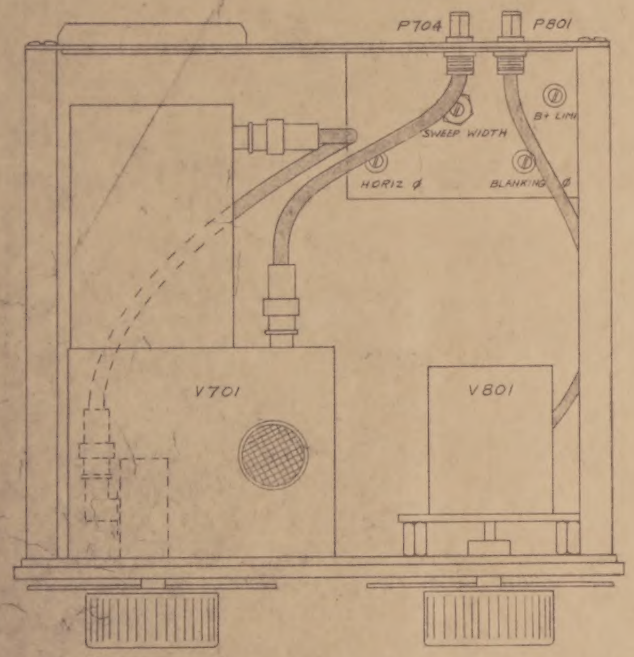
CIRCUIT REF.	DESCRIPTION	TELONIC PART NO.
C601	CFP, 0.1 µf, ±20%, 200 VDCW	C-200
C602	SC	NA
C603	CFD, 0.005 µf, +80-20%, 500 VDCW	C-49
C701	CVA (Part of L701)	NA
C702	CVA (Part of L702)	NA
C703	CFT (SC)	NA
C704	CVA (Part of L704)	NA
C705	CVA (Part of L705)	NA
C706	CVA (Part of L706)	NA
C707	CVA (Part of L707)	NA
C708	CVA (Part of L708)	NA
C709	CFCF, 1000 pf, ±20%, 500 VDCW	C-89
C710	Same as C709	
C711	Same as C709	
C712	CFC, 100 pf, 500 VDCW	C-109
C713	CFC, 20 pf, 500 VDCW	C-128
CR701	DSD, 1N25A	D-8
CR702	DSD, S3411G	D-22
J701	RJ, UG-447/U	J-22
J702	JC, UG-535/U	J-6
J703	Part of Z701	NA
J704	RJ, 4867-1	J-31
P701	PC, UG-88C/U	J-13
P702	Same as P701	
P703	Same as P701	
P704	RJ	J-27
L701	IF, Tuned Line	NA
L702	IF, Tuned Line	NA
L703	IF, Coupling Strap	NA
L704	IF, Tuned Line	NA
L705	IF, Tuned Line	NA
L706	IF, Tuned Line	NA
L707	IF, Tuned Line	NA
L708	IF, Tuned Line	NA
L709	IF, Coupling Strap	NA
L710	IF, 2.2 µh	L-101
L711	Same as L710	
L712	IF (SC)	NA
L713	Same as L710	
L714	IF, 1.0 µh	L-102
R601	RVC, 50 KΩ, ±10%, 0.2W	R-725
R602	RVC, 10 KΩ, ±10%, 0.3W	R-740
R603	RFC, 56 KΩ, ±10%, 1/2W (SC)	R-71
R604	RFC, (SC)	N/A
R605	RVW, 25 Ω, 5 W	R-782
R606	Same as R601	
R607	RFC, 5.6 KΩ, ±10%, 1/2 W (SC)	R-22
R608	RFW, 4 Ω, ±5%, 5 W	R-410
R609	RFC, 220 KΩ, ±10%, 1/2 W	R-44
R701	RFC, 3.9 KΩ, ±10%, 1/2 W	R-40
R702	RFC, 51 Ω, ±5%, 1/2 W	R-3
R703	RFC, 220 Ω, ±10%, 1/2 W	R-39
V701	TE, 6DZ4	VT-51
Z701	Filter, low pass	811-010
Z702	Drive Motor	808-120

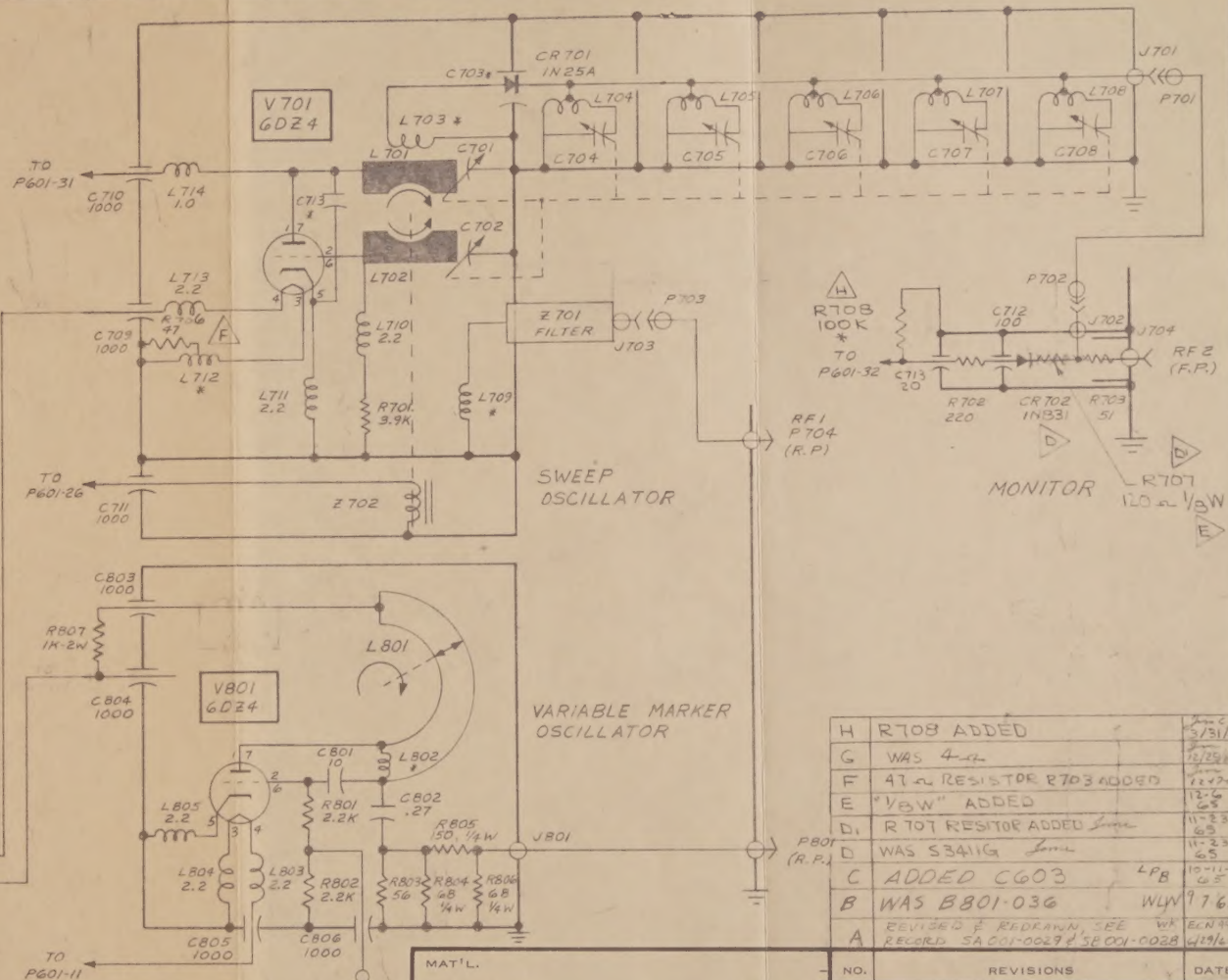
VARIABLE MARKER (E-1M ONLY)

CIRCUIT REF.	DESCRIPTION	TELONIC PART NO.
C801	CFC, 10 pf, ±10%, 1000 VDCW	C-48
C802	CFN, 0.27 pf, ±10%, 500 VDCW	C-130
C803	CFCF, 1000 pf, ±20%, 500 VDCW	C-110
C804	Same as C803	
C805	Same as C803	
C806	CFCF, 1000 pf, ±20%, 500 VDCW	C-39
J801	TC, MX-1684/U	J-54
P801	RJ	J-27
L801	IV, Tuned Line	NA
L802	IF	NA
L803	IF, 2.2 µh	L-101
L804	Same as L803	
L805	IF, 2.2 µh	L-100
R801	RFC, 2.2 KΩ, ±10%, 1/2 W	R-20
R802	Same as R801	
R803	RFC, 56 Ω, ±5%, 1/2 W	R-53
R804	RFC, 68 Ω, ±5%, 1/4 W	R-1474
R805	RFC, 150 Ω, ±5%, 1/4 W	R-1475
R806	Same as R804	
R807	RFC, 1 KΩ, ±10%, 2 W	R-302
V801	TE 6DZ4	VT-51

ABBREVIATION CODE

CFP	Capacitor, fixed, paper
CFD	Capacitor, fixed, Discap.
CFC	Capacitor, fixed, ceramic
CFCF	Capacitor, fixed, ceramic feed-thru
CFN	Capacitor, fixed, composition
CFT	Capacitor, fixed, Teflon
CVA	Capacitor, variable, air
DSD	Device, semiconductor diode
IF	Inductor, fixed
IV	Inductor, variable
JC	Jack, cable
NA	Not assigned
PC	Plug, cable
RFC	Resistor, fixed, composition
RJ	Receptacle, Jack
RVC	Resistor, variable, composition
RVW	Resistor, variable, wirewound
SC	This part subject to change
TC	Terminator, cable
TE	Tube, electron





NO.	REVISIONS	DATE
H	R708 ADDED	from C 5/31/66
G	WAS 4.7K	from C 10/25/65
F	47Ω RESISTOR R703 ADDED	12-7-65
E	"1/8W" ADDED	12-7-65
D1	R707 RESITOR ADDED	11-23-65
D	WAS 53411G	11-23-65
C	ADDED C603 LPB	10-11-65
B	WAS B801-036 WLW	9-7-65
A	REVISED & REDRAWN, SEE RECORD SA001-0029 & SB001-0028 WK	6/29/65

ECN 1471
ECN 1248
ECN 1220
ECN 1211
ECN 1153
ECN 1129

MAT'L.

FINISH

DESIGN BY	DATE	DRAWN BY	DATE
		WLK	6/28/65
CH'K'D. BY		PROD. APP'D.	
RW	6/29/65		

TOLERANCES
UNLESS SPECIFIED WITH LIMITS
DECIMAL DIMENSIONS MAY VARY +.005-.005
FRACTIONAL DIMENSIONS MAY VARY +1/64-.1/64
DRILL, PUNCH, COMMERCIAL STOCK SIZES AND MANUFACTURER'S TOLERANCES ARE NOT INCLUDED.
DO NOT SCALE THIS DRAWING

Teloric INDUSTRIES, INC.
60 N. FIRST AVE. BEECH GROVE, INDIANA

SCALE	PART NO.
NONE	B 801-036

SCHEMATIC DIAGRAM
E-1, 1M PLUG-IN HEAD

SHEET	OF	
2	2	SB001-0029

MARBAUGH